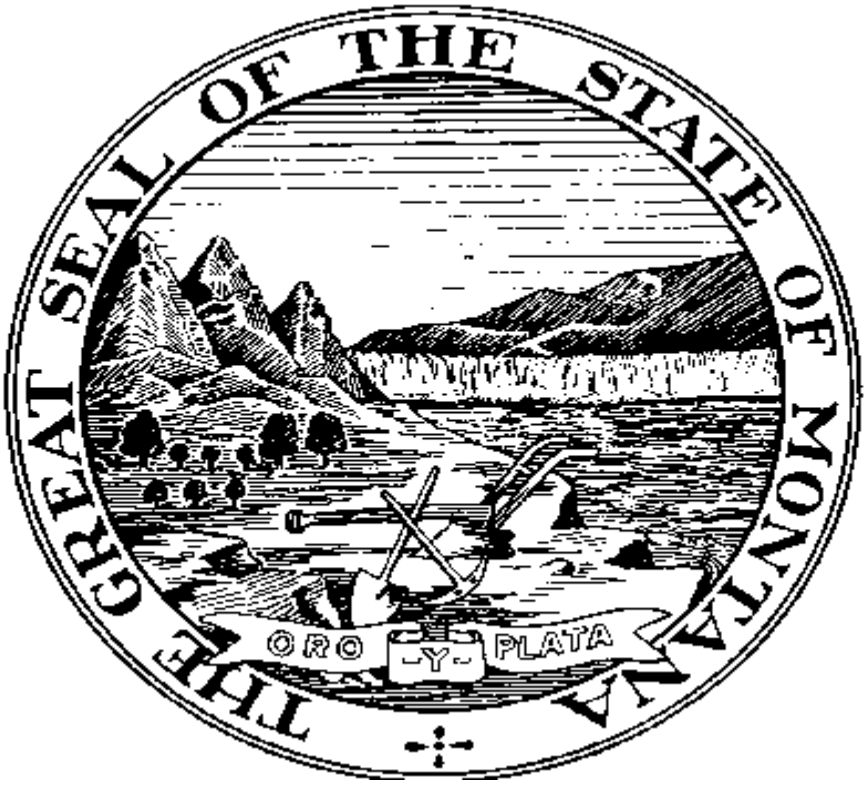
Flammable Liquid Storage Cabinets
29 CFR 1910.106(d)(3)

Occupational Safety and Health Bureau



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by the

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Design, Construction, and Capacity of Flammable Liquid Storage Cabinets

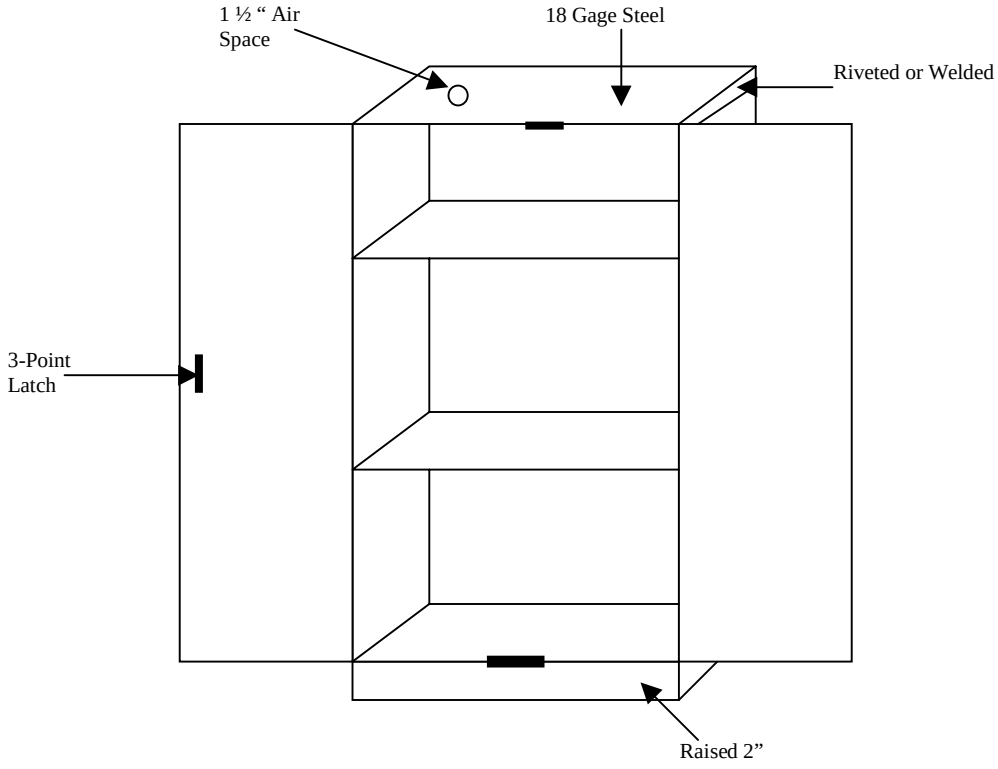
29 CFR 1910.106 (d)(3)

(i) Maximum capacity. Not more than 60 gallons of Class I or Class II liquids, nor more than 120 gallons of Class III liquids may be stored in a storage cabinet.

(ii) Fire resistance. Storage cabinets shall be designed and constructed to limit the internal temperature to not more than 325 degrees F. when subjected to a 10-minute fire test using standard time-temperature curve as set forth in Standard Methods of Fire Test of Building Construction and Materials, NFPA 251-1969. All joints and seams shall remain tight and the door shall remain closed during the fire test. Cabinets shall be labeled in conspicuous lettering, "Flammable –Keep Fire Away."

(a) Metal cabinets constructed in the following manner shall be deemed to be in compliance. The bottom, top, door, and sides of the cabinet shall be at least No. 18 gage sheet iron and double walled with 1 ½ inch air space. Joints shall be riveted, welded or mad tight by some equally effective means. The door shall be provided with a three-point lock, and the doorsill shall be raised at least 2 inches above the bottom of the cabinet.

Figure 1. Metal Storage Cabinet

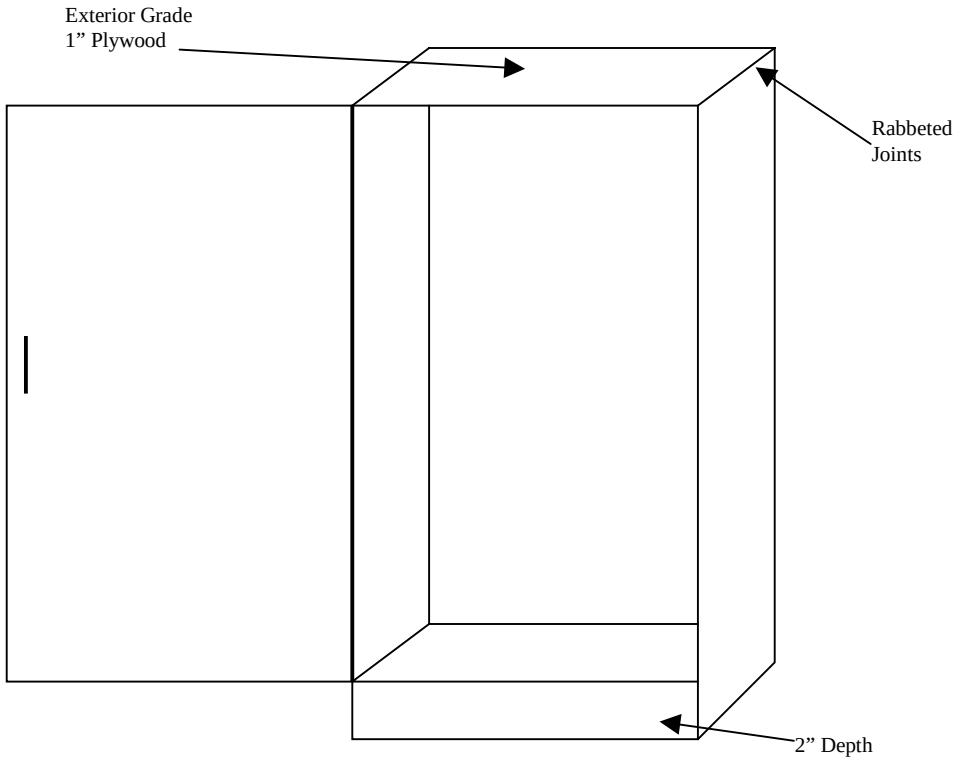


The three-point latch arrangement on the doors is intended to help maintain the integrity of the cabinet under a fire exposure. Without a three-point latch arrangement, the metal

will warp when exposed to a fire and expose the cabinet's contents to the fire. Note that the Code does not specify a test for cabinets built in accordance with the paragraph.

(b) Wooden cabinets constructed in the following manner shall be deemed in compliance. The bottom, sides, and top shall be constructed of an approved grade of plywood at least 1 inch in thickness, which shall not break down or delaminate under fire conditions. All joints shall be rabbetted and shall be fastened in two directions with flathead wood screws. When more than one door is used, there shall be a rabbetted overlap of not less than 1 inch. Hinges shall be mounted in such a manner as not to lose their holding capacity due to loosening or burning out of the screws when subjected to the fire test.

Figure 2. Wooden Storage Cabinets



Wooden cabinets constructed in this manner are acceptable. Note that the Code does not require a three-point latch on doors of wooden cabinets. When exposed to fire, wood does not tend to warp or distort.

Classification of Flammable and Combustible Liquids

Flammable and combustible liquids are classified by NFPA 321, *Standard on Basic Classification of Flammable and Combustible Liquids*, based on flash point, boiling point, and vapor pressure.

Flammable liquids

Flammable liquid means any liquids having a flash point below 100 degrees F. and having a vapor pressure not exceeding 40 psia at 100 degrees F.

Class I – liquids have flash points below 100 degrees F.

> Class IA – liquids with flash points below 73 degrees F. and have a boiling point below 100 degrees F.
>
> Class IB – liquids with flash points below 73 degrees F. and have a boiling point at or above 100 degrees F.
>
> Class IC – liquids with flash points at or above 73 degrees F. and below100 degrees F.

Combustible liquids

Combustible liquids are liquids with a flash point at or above 100 degrees F. and are referred to as a combustible liquid.

Class II – liquids that have a flash point at or above 100 degrees F. and below 140 degrees F.

Class IIIA – liquids that have a flash point at or above 140 degrees F. and below 200 degrees F.

Class IIIB – liquids that have a flash point at or above 200 degrees F.

Flammable and Combustible Liquids Code Handbook

Glass Containers

4-2.3.2 Class IA and Class IB liquids may be stored in glass containers of not more than one gallon capacity if the required liquid purity (such as ACS analytical reagent grade or higher) would be affected by storage in metal containers or if the liquid would cause excessive corrosion of the metal container.

This exception is included to avoid unnecessarily restricting research operations involving flammable and combustible liquids, while still providing an acceptable degree of fire safety. The keys in applying this Code section are: (1) that the liquid is to be stored, (2) that the purity of the liquid would be affected if stored in approved metal containers, and (3) to consider the effect of the liquid on the structural capabilities of the container.

4-3.1 4-3.1 Not more than 120 gallons (454.2 L) of Class I, Class II and Class IIIA liquids may be stored in a storage cabinet. Of this total, not more than 60 gallons (227.1 L) may be of Class I and Class II liquids and not more than three (3) such cabinets may be located in a single fire area, except that, in an industrial occupancy, additional cabinets may be located in the same fire area if the additional cabinet, or group of not more than three (3) cabinets, is separated from other cabinets or group of cabinets by at least 100 ft. (30.48 m).

Depending upon the particular occupancy of a building, certain lesser quantities of flammable or combustible liquids are permitted to be stores in a safe place, outside of a specific storage cabinet room. (See Section 4-5 and Chapters 5 through 7 for additional details as to when storage cabinets are required.) Large quantities will often be required to be stored in a separate storage room or area, or possibly may require storage in a flammable liquid warehouse.

Provisions covering locations where flammable or combustible liquids may be stored are arranged in the Code according to increasing size, from storage cabinets, inside rooms, cutoff rooms, and attached buildings, to warehouses.

Most commercially available and approved storage cabinets are built to hold 60 gallons or less of flammable and combustible liquids. A fire area is an area of a building separated from the rest of the building by construction having a fire resistance rating of at least 1 hour and having all communicating openings properly protected by an assembly having a fire resistance rating of at least 1 hour. Not that in industrial occupancies, the concept of fire area can be achieved by distance [100 ft] as well as by construction.

Industrial occupancies are intended to include factories making products of all kinds, and properties devoted to operations such as processing, assembling, mixing, packaging, finishing or decorating, and repairing.